Utilization of Educational Innovations and Technology in Research and Extension Functions of State Universities

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Abstract - *The study focused on the extent of utilization of the educational innovations and technology in research and extension functions of SUs. The descriptive design, triangulation method, and purposive sampling were applied in this study. The findings revealed that majority of the respondents are married adults and master's degree graduates with education as their area of specialization. They are permanent in status and have considerable years in the University serving as research or extension officer. Research of SUs have common research thrusts in terms of environment and natural resources management but differ in their own respective agenda; similarly the SUs share common extension thrusts and concerns but differ in their programs, activities and projects related to community services. Commonly encountered problems concern inadequate funds and inability to access the available technology. Officers utilized educational innovations on research and extension to a moderate extent but software and hardware were utilized to a great extent; likewise internet-based communication was utilized to a great extent for research but used moderately for extension. This implies that compared to research, most of the extension functions do not require the use of internet-based communication. From the results of the study, it was recommended that review of the existing allocation of funds for technology development may be done to improve the existing hardware, software and communication facilities.*

Keywords*: educational innovations, educational technology, hardware, software*

INTRODUCTION

Education has become of more impact today more than ever with the onset of educational and technological innovations. They have become defining forces in the improvement of how learning will come about and determine the quality of learning one will acquire. This is tantamount to saying that with the use of innovations and technology the delivery of learning is greatly improved. Advocates of education and information technology claim that their use makes the learning experience richer and expanded with more possibilities. For instance, with these innovations, there are more opportunities to learn and more resources to use, and much more materials that can be explored so that those in institutions, their academic community is able to share and make their delivery of services richer, updated and more relevant.

Of the entities and organization that may benefit from such developments are state universities which are complementary partnersof the government in the attainment of national goals. State universities serve as conduits so that the nation would be provided with future manpower who later on should be responsible and productive members of society. In effect, this means that state universities must ensure that the mandates that are given to them are met so that the future manpower that may be produced by state universities will be those who are knowledgeable; skills equipped and can independently learn on their own and apply them in their own field of work.

State universities in the Philippines have four basic functions which are their mandates as required by regulating bodies such as the Commission on Higher Education, accrediting bodies and national agenda directed by the government. These include instruction, research, extension and production. Of these, much focus has been given to instruction and its delivery, but through the years, the universities have been made responsible likewise to pursue the mandates of research and extension as these are the higher marks of what universities should be. As one of the priority areas of Higher Learning Institutions,

documents showed that not much priority was given to research at the institution. Though the teachers were required to work on annual action researches, not much degree of seriousness was attributed to the said undertaking. Though seminars and conferences were sponsored by the school, the teachers' lack of time to really focus on the activity hindered them to achieve a great degree of success in research [1].

This study posits that educational innovations and technology will make the tasks of research and extension more viable, enriched and relevant. Educational innovations such as learning management system, mobile technology, electronic learning environment, virtuallearning environment system, e-assessment, e-portfolio and online collaboration can be applied in conducting research and extension activities. Mentioned innovations can be utilized in research and extension on ways how to easily collaborate with people and access information or resources through the internet particularly when trying to look for findings of other studies and important concepts. Establishing collaborative research projects with the other universities, generating reports and exporting data are also made possible. Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources [2].To strengthen the mandates on research and extension, CHED issued policies and guidelines for the use of income, special trust fund and programs of receipts and expenditures of the state universities and colleges [3].

Profile of the respondents is important in addressing the issue of the utilization of educational innovations and technology in research and extension functions. A research and extension officer may differ in the use of educational innovations and technology. The younger ones or those with area of specialization leaning more on the disciplines which require computer skills or those who have been long in the service or of a higher designation may be more equipped in computer skills or are more adept in use of innovations and technology and therefore use them extensively in research and extension functions.

With the above-mentioned importance of innovations and technology in research and extension, the researcher believes that this study will further help in the best performance of research and extension officers of state universities who play a vital role in theconduct of and implementation of their functions in research and extension in their respective academic institution.

OBJECTIVES OF THE STUDY

The study focused on the utilization of educational innovations and technology in research and extension functions of state universities in Region IV-A, Philippines. It surveyed the profile of the respondents in terms of age, civil status, highest educational attainment, designation or position, area of specialization, length of service and employment status and dwelt on the research and extension thrusts and concerns of the SUs. The extent in the utilization of the educational innovations and technology in research and extension by the SUs were studied. Relationship between the profile of the respondents and the extent of utilization was given consideration. Moreover, problems encountered related to the educational innovation and technology were given consideration.

METHODS

The study used descriptive research design. Survey was the method used. This study had as its subjects research and extension officers of five state universities in Region IV-A namely Cavite State University, Laguna State Polytechnic University, Batangas State University, University of Rizal System and Southern Luzon State University. The descriptive research design was used as it was best deemed to be able to provide better data on profile of research and extension officers and give information on the extent of utilization of educational innovations and technology.

The instrument used in the study was a researcher-made survey questionnaire which was shown to experts in the field for content validation. It was also shown to an English professor for clarity of direction and conciseness of content. The validated questionnaire was administered to ten faculty members who were not included in the study to test its validity and reliability. Content validation was determined using Cron Bach alpha (α).The obtained r-value was 0.891 which was greater than the critical r-value of 0.602, at 0.05 level of significance at nine degrees of freedom indicating that the questionnaire was valid. The reliability of the research instrument was also determined using Kuder-Richardson Formula 21. The obtained value was 0.844 which was also greater than the critical value r at 0.602 and at 0.05

level of significance indicating that the instrument was reliable.

The respondent's extent of utilization was determined based on a five-point scale: 4.50-5.00 – To a Very Great Extent; 3.50-4.49 – To a Great Extent; 2.50-3.49 – To a Moderate Extent; 1.50-2.49 – To Some Extent; 1.00-1.49 – To Least Extent.

Purposive sampling was used in the selection of respondents which included only the research and extension officers considering the nature and coverage of the study. The respondents of the study were 94 broken down to 10 directors, 10 assistant directors, five department heads and 69 coordinators taken from the different departments of the respective university. Distributed questionnaires were all retrieved, thus, 100% response rate was obtained.

The researcher requested approval from the president and other officials of state universities to conduct the study and was allowed to distribute questionnaires to research and extension officers. The researcher indicated in the request letter that any information from their office will be taken with utmost confidentiality and strictly for academic purposes only.

The researcher personally approached the research and extension officers of each state university to inform the purpose of the study. Retrieval of the questionnaire was done personally by the respondents in three state universities while the other questionnaires in two universities were by arrangement with their administration staff.After the retrieval of the questionnaires, the results were tabulated and statistically analyzed. To describe the data, it was quantitatively measured through percentage, weighted mean and chi-square.

RESULTS AND DISCUSSION

Table 1. Description of the Respondents in Terms of Age

Age (years)	Frequency	Percentage
21-25	8	8.51
26-30	6	6.38
31-35	19	20.21
36-40	13	13.83
41-45	15	15.96
46-50	10	10.64
51-55	12	12.77
56-60	7	7.45
61-65	4	4.25
Overall	**94**	**100**

As shown in Table 1, most of the respondents were within the age bracket of 31-35 with only a few officers within 61-65. These indicate that research and extension officers are willing to provide their services to the university at their younger age as well as in their retiring age.

Table 2. Description of the Respondents in Terms of Civil Status

Civil Status	Frequency	Percentage
Single	15	15.96
Married	74	78.72
Widow/Widower	4	4.26
Separated	1	1.06
Overall	**94**	**100**

Table 2 shows that majority of the respondents are married. This was expected as considering that the respondents' cluster of age ran from 31 and above which can be considered as marrying age.

Table 3. Description of the Respondents in Terms of Highest Educational Attainment

Civil Status	Frequency	Percentage
Bachelor's Degree	14	14.89
Master's Degree	71	75.53
Doctorate Degree	9	9.57
Overall	**94**	**100**

Data in Table 3 show that research and extension officers are master's degree graduates. It can be inferred that most officers of state universities in Region IV-A are research oriented considering that they have a master's degree, the program of which requires research work; likewise their functions as research and extension officers provide them exposure on work in these fields.The findings also indicate that SUs comply with CHED Memorandum Order No. 40, s. 2008. Section 35 Article VIII that the minimum education requirement for faculty positions in higher education institutions is a master's degree.

Table 4. Description of the Respondents in Terms of Designation/Position

Designation/Position	Frequency	%
Director	14	14.89
Assistant Director	71	75.53
Department Head	9	9.57
Coordinator		
Overall	**94**	**100**

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As could be observed in Table 4, more than half of the total population of research and extension officials in SUs of Region IV-A were coordinators. The university had only one designated director for research and extension but had one research coordinator and one extension coordinator per department.

Table 5. Description of the Respondents in Terms of Area of Specialization

Area of Specialization	Frequency	%
Science	8	8.51
Mathematics	7	7.45
Management	7	7.45
Education	26	27.66
Nursing	8	8.51
Criminology	1	1.06
Language	5	5.32
Business &Tourism	7	7.45
Technology& Compute	11	11.70
Engineering	5	5.32
Bachelor of Arts	7	7.45
Agri& Horticulture	2	2.13
Overall	**94**	**100**

Table 5 shows that most of the respondents had education as the area of specialization. Different area of specialization were also observed. The findings reveal that there is no required area of specialization to be designated as research and extension officers.

Table 6. Description of the Respondents in Terms of Length of Service

Length of Service (years)	Frequency	%
1-10	33	35.11
11-20	26	27.66
21-30	23	24.47
31-40	9	9.57
41 years and above	3	3.19
Overall	**94**	**100**

The data in Table 6 reveal that most of the research and extension officers are on their early years of serving the university and although they do not have long years of service, it appears that they have been entrusted with the responsibility of helping their university in the attainment of research and extension productivity of their respective institution.

Employee's length of service refers to the duration of time that the employee has been employed of the same employer or company. This status may be interpreted as showing commitment and dedication to assigned responsibilities as research and extension officers aside from the usual teaching assignments and other duties to their families [4].

Table 7. Description of the Respondents in Terms of Employment Status

Employment Staus	Frequency	%
Permanent	68	72.34
Temporary	15	15.96
Contractual	11	11.70
Overall	**94**	**100**

Table 7 shows that majority of the respondents were permanent in status compared to those with temporary appointment and those with contractual status. This indicates that the human resources of the institution are important in the attainment of research and extension productivity. Security of tenure of faculty members is essential in order to maintain continuity and stability of work within the institution and facilitate members' ability to perform their duties and responsibilities. This means that officers of SUs continuously serve their institution to develop a culture which will help in the realization of research and extension productivity.

Research and Extension Thrusts and Concerns of the SUs

Research thrusts and concerns of State Universities in Region IV-A were found to be similar in their thrusts on environment and natural resources management but differed in their agenda: Cavite State University focused on coffee and kaong research and development, and agriculture; Batangas State University concentrated on the agenda on food, energy, science and mathematics; the University of Rizal System dwelt on culture and arts, freshwater aquaculture and agro-socio social productivity; and the Southern Luzon State University worked on cooperative and entrepreneurship, banahaw project, aqua-silviculture, rubber and apiculture. Moreover, the SUs in the Region had similar extension thrusts and concerns in their implemented programs, activities and projects related to community services but differed in their services in the areas of programs, activities and projects (PAPs).

Table 8. Extent of Utilization of Educational Innovations in Research

Items	WM	VI
1. Learning Management System as observed in the delivery of online training as well as automates record-keeping.	3.26	UME
2. Mobile Technology as applied in the way people access and share information.	3.72	UGE
3. Electronic Learning Environment useful for researchers as they can find easily educational resources on places they normally use.	3.72	UGE
4. Virtual Learning Environment System (VLES) observable in the use of tools to help researchers place materials on the VLE in the form of electronic files which will then be downloaded.	3.35	UME
5. E-assessment toward the use of information technology for any assessment-related activity ranging from the use of a word processor to on-screen testing.	3.50	UGE
6. E-portfolio useful in the collection of work for Outcomes Assessment, select work randomly and anonymously, generate reports and export raw data for further analysis.	3.26	UME
7. Online Collaboration as utilized in the use of technology in exchanging ideas and providing access to more people and establish collaborative research projects with schools.	3.22	UME
Composite Mean	**3.43**	**UME**

WM – Weighted Mean; VI – Verbal Interpretation; UGE – Utilized to a Great Extent UME – Utilized to a Moderate Extent

As reflected in Table 8, mobile technology, electronic learning environment and e-assessmentwere used to a great extent. Mobile technology was used extensively as it inexpensively delivers information while the electronic learning environment facilitates use of educational resources through the different search engines in the web. Each obtained a weighted mean of 3.72.The finding proves that research officers were familiar that e-assessment can be used to assess new educational goals particularly in relation to research; this can provide useful data.

The findings reveal that the research officers of the universities utilized mobile technology, electronic learning environment and e-assessment on the performance of their duties. This infers that they are aware of the usefulness of these innovations as they can easily gain access and can share information important to their tasks. Research, specifically needs electronic sources as they provide updated information and new knowledge and trends which are relevant to provide them objective data.

The success of mobile technology has resulted in opportunities for innovation and creativity in technology, marketing and business strategy. Companies worldwide are going mobile to increase productivity, speed delivery to market and reduce operating costs [5].

Utilization of educational innovations in research obtained a composite mean of 3.43 perceived as utilized to a moderate extent which means that in the

Table 9. Extent of Utilization of Educational Innovations in Extension

Items	WM	VI
1. Learning Management System as observed in the delivery of online training as well as automates record-keeping.	3.02	UME
2. Mobile Technology as applied in the way people access and share information.	3.37	UME
3. Electronic Learning Environment useful for staff as they can find easily educational resources on places they normally use.	3.46	UME
4. Virtual Learning Environment System (VLES) observable in the use of tools to help workers place materials on the VLE in the form of electronic files which will then be downloaded.	3.00	UME
5. E-assessment toward the use of information technology for any assessment-related activity ranging from the use of a word processor to on-screen testing.	3.15	UME
6. E-portfolio useful in the collection of work for Outcomes Assessment, select work randomly and anonymously, generate reports and export raw data for further analysis.	2.96	UME
7. Online Collaboration as utilized in the use of technology in exchanging ideas and providing access to more people and establish collaborative extension projects with schools.	2.93	UME
Composite Mean	3.13	UME

accomplishment of research outputs, the research officers were moderately utilizing educational innovations.

It can be gleaned from table 9 that electronic learning environment ranked first with a weighted mean of 3.46; however it was used to a moderate extent as assessed by the extension officers. The actual benefit of the use of the electronic learning environment is to easily find educational resources through the internet. Extension officers revealed that knowledge on the existing electronic learning environment can be of help in the performance of their duties. Other educational innovations like mobile technology, e-assessment, learning management system, virtual learning environment system, e-portfolio and online collaboration were all utilized to a moderate extent.

At present, in order to be responsive to the needs and interests of the communities, planning on the preparation of different types of extension programs and projects are their main concerns, thus, all items were utilized to a moderate extent.

Concepts and information as well as current trends on implementations on services may be found in the internet.This could be done if the extension officers use support of electronic learning environment. It could be that the community programs extended does not as much need other knowledge from the internet.

E-learning, as a modern approach in training can be used to improve the effectiveness and efficiency of training in extension services. The internet can be an effective way to implement an in-service training [6].

Table 10 gives the assessment of research and extension officers on the extent of utilization of educational technology as to software. Presentation software was utilized to a great extent with a weighted mean of 3.98 and was ranked first. This could have been used to a great extent in research as this program tool is used in the construction and design of scientific poster template among others. Considering that research work also needs sharing of the results and findings and other related activities or presenting reports of the status of their programs , then the presentation software is used extensively also by research officers.

This shows that for research officers, presentation software is greatly utilized. The software facilitates presentation of a sequence of visuals which are projected onto a screen to help clarify or demonstrate the points of concern either in a lecture, a speech or a simple presentation. Evidently, this works well in the dissemination purposes in research work.

The presentation software was used to make a sequence of visuals which are projected onto a screen to help clarify or demonstrate the points made during a speech. Evidently, in whatever discipline as long as the purpose is to put ideas in screen to enlarge vision and highlight information, the presentation software will be effective [7].

Other computer software like word processing, spreadsheet application, SPSS, web browser, search engines, operating systems and on-line bibliography were also utilized to a great extent. These application programs which are run from the computer help research people to accomplish many tasks.

Table 10. Extent of Utilization of Educational Technology in Research as to Software

Items	WM	VI
1. Word processing software which can be used for writing research papers.	3.96	UGE
2. Spreadsheet application which allows the user to enter formulas to do automatic calculations, and has many standard functions	3.96	UGE
3. Presentation software, a program tool used in the construction and design of scientific poster template and other projects.	3.98	UGE
4. Database software used in creating and managing research databases	3.39	UME
5. Operating systems ensure that a computer can be used and do exactly what the user wants it to.	3.70	UGE
6. Web browser, a software application for retrieving, presenting and traversing information resources on World Wide Web.	3.91	UGE
7. SPSS (Statistical Product and Service Solutions) used for statistical analysis.	3.93	UGE
8. On-line bibliography and citation tools to help collect, organize, cite, and share research sources	3.65	UGE
9. Plagiarism checker tool, a plagiarism detection software that checks essays and papers for any plagiarism that may have stolen others work	3.28	UME
10. Use of search engines for online databases.	3.76	UGE
Composite Mean	**3.75**	**UGE**

Table 11. Extent of Utilization of Educational Technology in Extension as to Software

Items	WM	VI
1. Word processing software which can be used for writing documents for extension activities.	4.00	UGE
2. Spreadsheet application which allows the user to enter formulas to do automatic calculations, and has many standard functions such as average built in.	3.96	UGE
3. Presentation software, a program tool used in the construction and design of scientific poster template and other projects.	3.98	UGE
4. Database software used in creating and managing research databases	3.61	UGE
5. Operating systems ensure that a computer can be used and do exactly what the user wants it to.	3.83	UGE
6. Web browser, a software application for retrieving, presenting and traversing information resources on World Wide Web.	3.72	UGE
7. Use of search engines for online databases.	3.70	UGE
Composite Mean	**3.83**	**UGE**

In extension as to utilization of software (Table 11), extension officers used word processing software for extension activities to a great extent with a weighted mean of 4.00. This could be because the software is used to produce documents related to extension activities like proposals, memorandum of agreement, request letters, reports and others. These are important and should be stored for future reference. The composite mean was 3.83 indicating that software was utilized to a great extent in extension functions.

Word processors are one of the most flexible and widely used application software programs. A word processor can be used to manipulate text data to produce a letter, a report, a memo, an e-mail message or any other type or correspondence. It can also be used to create table of contents which shows a reader at a glance the topics that are included in the document and makes it easier for the reader to locate information [8]. Other software which were alsoutilized to a great extent are presentation software, spreadsheet application, operating systems, web browser, search engines and database software. It is expected that to cope with the modernization and global need for communications, not only teachers are expected to know different software applications but all other professionals should, including extension officials whose bulk of work can be greatly facilitated by use of computer software.

As to use of hardware in research reflected in Table 12, it was found out that LCD projector, printers, digital camera, personal or laptop computers, and web server were utilized to a great extent. The LCD is commonly used in research during presentation of projects or outputs. The respondents cited that the LCD projector is a tool which facilitates the demonstration and explanation of concepts, results and other research outputs. Other hardware components which were mentioned are equally important as that of the software tools in the functions of research officers.

The composite mean of 3.97, justified that hardware was utilized to a great extent in research. Hardware is the tangible part of a computer system. It refers to the equipment which is an integral part of the entire system.

Table 12. Extent of Utilization of Educational Technology in Research as to Hardware

Items	WM	VI
1. Personal or laptop computers with licensed mathematics and statistical applications for access and use of officers and staff to facilitate curricular and research work	3.98	UGE
2. Printers that can be utilized by research officers and staff that makes a representation of an electronic document on physical media.	4.15	UGE
3. Web Server helps deliver web content that can be accessed by clients through the Internet.	3.93	UGE
4. LCD Projector that can be used during presentation of projects or outputs	4.30	UGE
5. Interactive whiteboard can be used during presentation of research proposals.	3.41	UME
6. Digital camera is a tool used to capture important images and videos essential for documentation of research activities	4.06	UGE
Composite Mean	**3.97**	**UGE**

Table 13. Extent of Utilization of Educational Technology in Extension as to Hardware

Items	WM	VI
1. Personal or laptop computers for access and use of officers and staff to facilitate extension activities	4.22	UGE
2. Printers that can be utilized by extension officers and staff that makes a representation of an electronic document on physical media.	4.11	UGE
3. Web Server helps deliver web content that can be accessed by clients through the Internet.	3.76	UGE
4. LCD Projector that can be used during presentation of projects or outputs	4.15	UGE
5. Interactive whiteboard can be used during presentation of extension projects.	3.41	UME
6. Digital camera is a tool used to capture important images and videos essential for documentation	4.13	UGE
Composite Mean	**3.96**	**UGE**

Table 13 shows the utilization of hardware in extension. Responses revealed that personal and laptop computers, LCD projector, digital camera, printers, and web server were all utilized to a great extent. This revealed that all IT hardware components except for interactive whiteboard were frequently utilized.These are used for access and use of officers and staff to facilitate extension activities. Microcomputers may be most important to extension officers because of their powerful and extremely useful tools that help them in extension activities.

The data further reveal that utilizing computer and other peripheral devices is a necessity in order to conform to the objective of improving the quality of life of people in different communities through extension services.

The use of hardware and other ICT equipment promotes the establishment of extension centers in communities and improving quality of their life through the adoption of modern and innovative modes of transmitting knowledge such as the use of information technology, the dual system, open learning, community laboratory, etc., for the promotion of greater access to higher education[9].

The composite mean was 3.96 indicating that hardware was used to a great extent in extension functions.

Table 14. Extent of Utilization of Educational Technology in Research as to Internet-Based Communication

Items	WM	VI
1. Instant messaging, service that enables individual to create a kind of private chat room with others in order to communicate in real-time over the Internet.	3.67	UGE
2. Internet telephony & VoIP enables the use of the Internet as the transmission medium for telephone calls. Provides free telephone calls anywhere in the world	3.11	UME
3. E-mail, an effective way to communicate with a group because you can broadcast a message or document to everyone in the group at once.	4.26	UGE
4. Videoconferencing enables a conference between two or more participants at different sites by using computer networks to transmit audio and video data.	3.04	UME
5. Wireless Fidelity, wireless networking technology that allows computers and other devices to communicate over a wireless signal	3.74	UGE
Composite Mean	**3.56**	**UGE**

As to the utilization of internet-based communication in research (Table 14), the respondents cited that e-mail, wireless fidelity, and instant messaging were utilized to a great extent. To the respondents this might mean that using those communication devices as a research tool offers advantages like easy access to world-wide information, low administration costs and easy to use.

The composite mean was 3.56 which justified that inter-based communications were utilized to a great extent in research.The data revealed that accurate and timely information can be gathered essential to the functions of research officers with the use of internet-based communication.

The fact that research productivity contributes towards image building for universities and colleges as well as ranking, it becomes highly necessary for universities toinvest on access to electronic resources [10].

Table 15. Extent of Utilization of Educational Technology in Extension as to Internet-Based Communication

Items	WM	VI
1. Instant messaging, service that enables individual to create a kind of private chat room with others in order to communicate in real-time over the Internet.	3.65	UGE
2. Internet telephony & VoIP enables the use of the Internet as the transmission medium for telephone calls. Provides free telephone calls anywhere in the world	3.30	UME
3. E-mail, an effective way to communicate with a group because you can broadcast a message or document to everyone in the group at once.	4.02	UGE
4. Videoconferencing enables a conference between two or more participants at different sites by using computer networks to transmit audio and video data.	2.89	UME
5. Wireless Fidelity, wireless networking technology that allows computers and other devices to communicate over a wireless signal	3.41	UME
Composite Mean	**3.45**	**UME**

Internet-based communication in extension (Table 15)showed that e-mail and instant messaging was utilized to a great extent.This finding is the same with the utilization of technology in research. At present, e-mail is considered the easiest and fastest way to communicate with other people.

In terms of computer skills, e-mail was greatly used among the internet systems [11]. The existence of electronic mail (e-mail) as an increasingly universal means of communication has been effective. Mail is delivered instantly from your office to anywhere in the world. No other method of delivery can provide this service. Compared to telephone calls, faxes, or overnight courier service, e-mail is less expensive.

Many people, especially younger people use instant messaging or cell phone text messages every day to communicate with friends. Some business and technical professionals also find instant messaging and text messaging to be a useful tool for quickly communicating with colleagues, customers, suppliers, and others. On several information technology projects, project managers have found that their team members can be more productive when they are allowed to work from home[12].

The composite mean was 3.45 indicating internet-based communication was utilized to a moderate extent. The developments in information technology greatly facilitate organizational control at a relatively low cost. The systems model of management shows that communication is needed for carrying out managerial functions and for linking the organization with its external environment[13].

It can be seen in Table 16 that the acquired values for the extent of utilization of educational innovations in research showed significant relationship to age, educational attainment, area of specialization, designation, length of service and employment status. Their understanding on how to properly use the existing innovations is not affected by their status in life; irregardless of civil status, they all similarly use some innovations to a great extent and those which are unavailable, costly and thoroughly technical, are used to a moderate extent in their research functions and work.

The same table shows that the acquired values for the extent of utilization of educational innovations in extension were significantly related to age, area of specialization, designation, length of service and employment status. This connotes that the mentioned variables influence the extent of use of educational innovation in extension activities.

Table 16. Relationship Between Profile of the Respondents and the Extent of Utilization of Educational Innovations in Research and Extension

			Research			**Extension**		
Profile	df	X^2t	X^2c	Decision Ho	Interpretation	X^2c	Decision Ho	Interpretation
Age	32	45.77	58.273	Reject	Significant	49.128	Reject	Significant
Civil Status	12	21.03	10.124	Accept	Not Significant	12.299	Accept	Not Significant
Educational Attainment	8	15.57	21.343	Reject	Significant	10.421	Accept	Not Significant
Area of Specialization	44	59.76	65.818	Reject	Significant	63.075	Reject	Significant
Designation	12	21.03	25.143	Reject	Significant	24.118	Reject	Significant
Length of Service	16	26.30	35.664	Reject	Significant	30.394	Reject	Significant
Employment Status	8	15.51	24.261	Reject	Significant	20.517	Reject	Significant

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Table 17. Relationship Between Profile of the Respondents and the Extent of Utilization of Educational Technology as to Software

			Research			Extension	
Profile	df	X^2t	X^2c	Decision Ho	Interpretation	X^2c	Decision Ho	Interpretation
Age	32	45.77	61.119	Reject	Significant	32.60	Accept	Not Significant
Civil Status	12	21.03	10.266	Accept	Not Significant	12.80	Accept	Not Significant
Educational Attainment	8	15.57	10.321	Accept	Not Significant	10.442	Accept	Not Significant
Area of Specialization	44	59.76	42.664	Accept	Not Significant	39.815	Accept	Not Significant
Designation	12	21.03	15.264	Accept	Not Significant	11.043	Accept	Not Significant
Length of Service	16	26.30	33.523	Reject	Significant	20.119	Accept	Not Significant
Employment Status	8	15.51	8.126	Accept	Not Significant	12.567	Accept	Not Significant

The relationship between the profile of the respondents and the extent of utilization of educational technology as to software in research and extension is manifested in Table 17.It can be noted in the table that extent of utilization of technology in research was significantly related to age and length of service. The extent of utilization was influenced by the mentioned indicators. The findings reveal that age and length of service of the respondents might affect the use of computer software in the performance of a job. It could be that the younger the age, the more adept are they in the use of PowerPoint, spreadsheets and word processors.

In the utilization of technology by extension officers as to software reflected also in Table 17 revealed all values do not significantly relate to the profile of the respondents as to age, civil status, educational attainment, and area of specialization, designation, length of service and employment status. The result indicates that the mentioned variables did not influence the extent of utilization of educational technology as to software. This means that the respondents have the skills on how to effectively utilize the educational technology in terms of software and use them extensively, while similarly they would only have moderate utilization of the database as this would mean great bulk of work and technical expertise to be able to use it appropriately and productively.

Table 18 indicates the relationship between the profile of the respondents and the extent of utilization of educational technology as to hardware in research and extension. As reflected in the table, age and length of service showed significant relationship to the extent of utilization of technology in research. It appears that those two mentioned variables have been influential to the respondents particularly in performing tasks in research with the use of technology. It could be that as the respondents grow older and have more years of work experience, the skills in using different hardware are much enhanced and are used making the use these extensively. They may have learned to work using an LCD projector, the laptop and the printer and use these extensively in the performance of their research functions or it could mean differently, that is the older the age and the longer the years of service, the lesser the enthusiasm to utilize technology in the performance of their work.

Table 18. Relationship Between Profile of the Respondents and the Extent of Utilization of Educational Technology as to Hardware

			Research			Extension	
Profile	df	X^2t	X^2c	Decision Ho	Interpretation	X^2c	Decision Ho	Interpretation
Age	32	45.77	51.114	Reject	Significant	58.377	Reject	Significant
Civil Status	12	21.03	15.041	Accept	Not Significant	18.562	Accept	Not Significant
Educational Attainment	8	15.57	12.563	Accept	Not Significant	9.334	Accept	Not Significant
Area of Specialization	44	59.76	35.669	Accept	Not Significant	37.589	Accept	Not Significant
Designation	12	21.03	17.583	Accept	Not Significant	14.199	Accept	Not Significant
Length of Service	16	26.30	29.833	Reject	Significant	14.196	Accept	Not Significant
Employment Status	8	15.51	9.271	Accept	Not Significant	11.043	Accept	Not Significant

Still in Table 18, it shows that acquired values for the extent of utilization of educational technology in extension were significantly related to age. This suggests that age affects the extent of use of educational technology as to hardware in extension activities. Extension officers, depending on their age, may or may not be eager to be updated on the latest development in technology, particularly in the application of different devices in the performance of their duties. It could be the younger ones have the exposure and the adequate skills in the use of hardware, they having been trained in their lower years in the use of hardware as compared to the senior ones who no longer have the drive to learn how to use them and assign possible work to their clerks or office personnel.

Profile of the respondents and the extent of utilization of educational technology as to internet-based communication in research and extension were shown in Table 19.It can be gleaned from the table that extent of utilization of educational technology in research as to internet-based communication were significantly related to age, designation, and length of service. This is a clear indication that stage in life, duties and responsibilities and number of years in the university could be the driving forces to effectively manage the use of internet-based communication. Their age, designation and length of service may influence the extensive use of internet connections. It could be that the younger officials would be more adept on use of the technology or those with higher position would prefer to do the thinking and leave the technology use to the younger ones. The variations on use of technology considering the aforementioned variables will affect their extensive use of the technology.

Based from the same table, the values for the extent of utilization of technology in extension as to internet-based communication were significantly related to age. This suggests that age was affected by the extent of use of educational technology as to internet-based communication in extension activities. Extension officers of universities of all ages find ways to use their resources to come up with the updates in education particularly in the application of technology and be able to use their knowledge and skill for the improvement of extension programs, activities and projects.

Table 19. Relationship Between Profile of the Respondents and the Extent of Utilization of Educational Technology as to Internet-Based Communication

		Research				Extension		
Profile	df	X^2t	X^2c	Decision Ho	Interpretation	X^2c	Decision Ho	Interpretation
Age	32	45.77	64.616	Reject	Significant	49.213	Reject	Significant
Civil Status	12	21.03	17.993	Accept	Not Significant	16.655	Accept	Not Significant
Educational Attainment	8	15.57	9.118	Accept	Not Significant	13.383	Accept	Not Significant
Area of Specialization	44	59.76	45.217	Accept	Not Significant	41.307	Accept	Not Significant
Designation	12	21.03	32.721	Reject	Significant	19.979	Accept	Not Significant
Length of Service	16	26.30	38.592	Reject	Significant	22.608	Accept	Not Significant
Employment Status	8	15.51	11.063	Accept	Not Significant	10.261	Accept	Not Significant

Table 20. Problems Related to Educational Innovations in Research and Extension (Multiple Response, N=94)

Items	Research			Extension		
	f	%	Rank	f	%	Rank
1. Lack of equal access to the use of innovation	58	61.70	1.5	52	55.32	1
2. Unavailability of broadband and bandwidth capabilities	54	57.45	3	46	48.94	2
3. Do not have easy or reliable access to computers and/or the internet	34	36.17	6.5	32	34.04	5
4. Introduction in the use of technology without considering the needed content	14	14.89	14	8	8.51	14
5.Problem on information security, integrity and accountability	30	31.91	9	28	29.79	6.5
6. Focusing on contents rather than outcomes	20	21.28	13	12	12.77	13

Table 20 (cont). Problems Related to Educational Innovations in Research and Extension (Multiple Response, N=94)

Items	Research			Extension		
	f	%	Rank	f	%	Rank
7. Lack of clarity about the rela-tionship of ICT to more traditional teaching and learning style	30	31.91	9	18	19.15	11.5
8. Varying approaches to staff training	40	42.55	5	26	27.66	8.5
9.Lack of information in relation to the proper use of educational innovation	28	29.79	11	24	25.53	10
10. Inadequate funds for educational development	58	61.70	1.5	44	46.81	3
11. Weak educational infrastructure	30	31.91	9	28	29.79	6.5
12.Lack of rewards or incentives for adopting innovative practices to drive improved student outcomes	44	46.81	4	42	44.68	4
13. Weak education practice to encourage innovation	34	36.17	6.5	26	27.66	8.5
14. Lack of clarity on the problem to be solved	22	23.40	12	18	19.15	11.5

Table 21. Problems Related to Educational Technology in Research and Extension (Multiple Response, N=94)

Items	Research			Extension		
	f	%	Rank	f	%	Rank
1. Negative experiences with ICT & fear of failure in technology adoption with a resultant loss of status	18	19.15	13	24	25.53	10
2. Lack of equal access to the use of technology	42	44.68	5	38	40.43	3.5
3. Lack of appropriate information and communication technology facilities	40	42.55	6	36	38.30	5
4. Unavailability of broadband and bandwidth capabilities	48	51.06	2	38	40.43	3.5
5. Inadequate access to computer facilities	34	36.17	8	18	19.15	12
6. Lack of time for both formal training and self-directed exploration	44	46.81	4	60	63.83	1
7.Lack of self-confidence with the use of information and communication technology	22	23.40	11	14	14.89	13
8.Unable to access the available tech or are simply not familiar with it to be able to use it effectively	46	48.94	3	30	31.91	7.5
9.Introduction in the use of technology without considering the needed content	16	17.02	14	10	10.64	14
10.Lack of information on the proper use of educational technology	30	31.92	10	20	21.28	11
11.Plan only for technology acquisition but not for upgrades and maintenance	20	21.28	12	34	36.17	6
12. Inadequate funds to respond to technology need practices to drive improved outcomes	52	55.32	1	54	57.45	2
13.Lack of practical application on the use of technology	32	34.04	9	30	31.91	7.5
14. Weak educational infrastructure	36	38.30	7	28	29.79	9

Innovation is not simply about a moment of invention; it is a cycle that includes several stages and the work of many stakeholders. Considering the positive output that innovation and technology could bring about to education particularly research and extension, barriers to achieve its goals cannot be prevented. Table 20 presents the problems related to educational innovations in research and extension. Among the problems related to innovations in research, lack of equal access to the use of innovation and inadequate funds for educational development was the main problems cited by the respondents.

One of the problems encountered by the respondents in using web-based instruction in computer application was slow access to the internet due to limited memory capability. This problem in internet capabilities is fund related as to have higher memory capability is to have more funds for it. Although funds are allotted to institutions, priority is first given to academic excellence and later to

different educational needs. However, due to the vast developments in SUs which include strong ICT capabilities, problems occur due to increasing needs[14].

Noticeably, extension officers likewise cited just like the research officers that lack of equal access to the use of innovation was main problem, ranked first. Equal access, not only to innovation is a problem. In the case for example of mobile technology, a person with a high quality gadget has the chance to access all the new features in the internet compared to others who cannot afford to have one.

Table 21 showed the problems related to educational technology in research and extension. Key problem related to technology in research was inadequate funds to respond to technology need and practices to drive improved outcomes. As it is, SUs' provision for funds is limited and is more geared towards the basics in instruction. Inadequate funds to respond to technology needs are the main problem among research officers in SUs because of their high cost which cannot be met by fund allocations. Equipment, computer software, and related materials may bring productivity to research units but with the inadequacy of such, programs may not be successfully implemented in research.

Further observed in Table 21 are problems related to technology in extension. Ranked first was lack of time for both formal training and self-directed exploration. Although trainings were provided by institutions for their officers to be well-oriented on the fast changing technology, available time to devote for this enhancement was a problem cited. This was due to teaching load beyond their approved regular hours. Though seminars and conferences were sponsored by the school, the teachers' lack of time to really focus on the activity hindered them to achieve a great degree of success.

This was also the result of a study which showed the importance of giving time for training. She stated that despite such high level of ICT integration, there is still a need for teachers to undergo a type of training that will focus on technology-based instruction to maintain the high level of instruction.Furthermore, teachers need to be updated with the latest trend in technology for further enhancement of their competencies [15].

CONCLUSION

This paper concluded that majority of the respondents are married adults and master's degree graduates with education as their area of specialization. They are permanent in status and have considerable years in the University serving as research or extension officer in their University. Research of SUs have common research thrusts of environment and natural resources management but differ in their own respective agenda ; similarly the SUs share common extension thrusts and concerns but differ in their programs, activities and projects related to community services.

Officers utilized educational innovations on research and extension to a moderate extent while software and hardware are used to a great extent in research and extension. Research uses internet-based communication to a great extent but is used to a moderate in extension.There is a significant relationship between the profile of the respondents in terms of age, educational attainment, area of specialization, designation, length of service and employment status and the extent of utilization of innovations in research. In terms of extension, it was the same with research except for educational attainment. Age has a significant relationship with the utilization of technology as to software in research functionas shown in the age bracket ranging from 31-35 years old which is higher compared with the age of 61-65.

In terms of the utilization of technology as to hardware, age has a significant relationship to both research and extension, while length of service was found to be significant in research only. It could be the younger ones and with 1-10 years of work experience have the exposure and adequate skills in the use of hardware, they have been trained in their lower years in the use of hardware as compared to the senior ones who no longer have the drive to learn how to use them and assign possible work to their clerks or office personnel. It could also be that the skills in using different hardware are much enhanced and are used extensively.

Utilization of technology as to internet-based communication was found to have a significant relationship to age in both research and extension and significant also to designation and length of service in terms of research only. It could be that the younger officials would be more skilled on the use of technology. Research and extension officers of all ages find ways to use their resources to come up with the updates in education particularly in the application of technology and be able to use their knowledge and

skills for the improvement of different research and extension activities.

In addition, commonly encountered problems related to educational innovations and technology concern inadequate funds to respond to technology needs, unavailability of broadband and bandwidth capabilities and inability to access the available technology.

With the advancement in technology, the nature and means of research and extension activities have completely changed. It becomes much easier to conduct research and extension activities. With a single click, research and extension officers can have easy access to vast field of knowledge and can easily perform different tasks in a fast and efficient way.

The present study evolves with the elastic administration and adaptive structuration theories that recognize the idea that the measures to strengthen the use of educational innovations and technology in research and extension functions is dependent upon the managements' awareness and willingness to adopt to the changes in technology. Knowledge on the updated application of technology to different research and extension activities is important to come up with the desired output. Freire's theory is important in this study because of the need to have concepts on how to immediately plan and come up with extension activities responsive to the needs of the communities of different state universities in Region IV-A.

RECOMMENDATION

It was recommended that review of the existing allocation of funds for technology development may be done to improve the existing hardware, software and communication facilities. The research and extension officers have to continuously improve their competence in determining how to properly utilize educational innovations through attendance to trainings, seminars and workshops. Varied and different approaches in trainings should be given emphasis by State Universities in research and extension to increase their capabilities particularly in the use of innovations and technology.

To effectively use the available technology, adequate time for trainings or workshops and appropriate facilities must be provided by the institution to their research and extension officers. More importantly, the users of the technology should have the knowledge and proper orientation on how to use the technology in the most effective and efficient way. Otherwise, despite the acquisition and provision of adequate and updated ICT facilities and infrastructure, with no skills, these technologies would have no use.

Practical application of learned technology should be considered by research and extension officers to use it effectively. Materials and equipment should also be adequate. They should complement each other to make officials have optimum use of the technology and benefit the community.

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